

CLAIMS

I claim:

1 1. A composite material forming a strap for restraining freight, the material
2 comprising:

3 a. a first layer comprising a plurality of strands comprising yarn having an
4 elongation characteristic within the range of about 2.5 percent to about 4.7 percent before
5 breaking and a creep of less than about 2 percent after elongation; and

6 b. a second layer of non-woven fabric comprising a substrate attached to the
7 first layer.

8 2. The composite material of claim 1, wherein the substrate is a spunbonded,
9 polyester, nonwoven fabric.

10 3. The composite material of claim 1, further including a portion having a third
11 layer comprising an adhesive substance positioned between the first layer and the second
12 layer.

13 4. The composite material of claim 1, wherein each of the plurality of strands of
14 yarn in the first layer is positioned generally parallel to a longitudinal axis of the second
15 layer and side-by-side and together formed into woven fabric.

1 5. The composite material of claim 1, further comprising a releasable adhesive
2 layer located on at least a portion of an outer surface of the composite material for
3 attachment to a surface of a transportation vehicle.

1 6. The composite material of claim 1, further including at least one finger edge
2 positioned on at least a portion of a length of the composite material.

1 7. The composite material of claim 6, wherein the first layer has a width less
2 than a width of the second layer and the at least one finger edge is formed by positioning
3 the first layer equidistant between a bottom edge of the second layer and a top edge of the
4 second layer.

1 8. The composite material of claim 1, wherein the first layer and second layer
2 collectively comprise about 0.017 inches in thickness and about 8 inches in width.

1 9. The composite material of claim 1, further comprising at least one
2 reinforcement strap coupled to the composite material forming a strap and positioned
3 generally parallel to a longitudinal axis of the strap.

1 10. The composite material of claim 1, wherein the yarn has a denier of about
2 1500.

1 11. A method of securing freight, comprising:

- 2 a. affixing a composite material forming at least one strap for restraining freight
3 to a surface of a transportation device, wherein the composite material comprises:
- 4 i. a first layer comprising a plurality of strands comprising yarn having
5 an elongation characteristic within the range of about 2.5 percent to about 4.7
6 percent before breaking and a creep of less than about 2 percent after
7 elongation; and
- 8 ii. a second layer of non-woven fabric comprising a substrate attached to
9 the first layer;
- 10 b. positioning freight on the surface of the transportation device; and
11 c. securing the freight by wrapping the at least one strap around the freight.

12. The method of claim 11, wherein securing the freight further comprises
13 joining a first end of the at least one strap to a second end of the at least one strap.

13. The method of claim 12, further comprising:
2 a patch comprising a third end and a fourth end, wherein the third end is pre-
3 attached to the strap at a contact section near the first end prior to installation around the
4 freight.

- 1 14. The method of claim 12, wherein securing the freight further comprises:
- 2 d. inserting a tool having a means for hold the first end of the at least one strap;
- 3 e. clamping an arm of the tool to the second end of the at least one strap;
- 4 f. rotating the tool until the at least one strap becomes generally taut;

5 g. adhering a patch across an intersection between the first and second ends of
6 the at least one strap using an adhesive; and

7 h. removing the tool from the first and second ends of the at least one strap.

1 15. The method of claim 14, wherein the adhesive for adhering the patch is a
2 non-releasable adhesive.

1 16. The method of claim 11, wherein securing the freight comprises a single
2 person using a tensioning tool to tighten the at least one strap around the freight and to
3 secure the at least one strap in a tightened position.

1 17. The method of claim 11, wherein affixing the composite material to the
2 surface is accomplished using a releasable adhesive.

1 18. The method of claim 11, wherein the surface for affixing the composite
2 material is selected from the group comprising a floor or a wall.

1 19. The method of claim 15, wherein the composite material further comprises at
2 least one reinforcement strap coupled to the at least one strap and positioned generally
3 parallel to a longitudinal axis of the strap and further comprises coupling a first end of the
4 at least one reinforcement strap to a second end of the at least one reinforcement strap.

1 20. A strap for restraining freight, comprising:

- 2 a. a first layer comprising a first end and a second end; and
3 b. a patch comprising a third end and a fourth end, wherein the third end is pre-
4 attached to the strap at a contact section near the first end prior to installation around the
5 freight.

1 21. The strap of claim 20, wherein the first layer is a nonwoven fabric.

1 22. The strap of claim 21, wherein the nonwoven fabric is a spunbonded,
2 polyester, nonwoven fabric.

1 23. The strap of claim 20, further comprising a second layer comprising a
2 plurality of strands of yarn forming a strap for restraining freight, wherein the yarn has an
3 elongation characteristic ranging from about 2.5 percent to about 4.7 percent before
4 breaking and a creep of less than about 2 percent after elongation.

1 24. The strap of claim 20, further comprising a third layer defining a releasable
2 adhesive located on at least a portion of an outer surface of the strap for attachment to a
3 surface of a transportation device.

1 25. The strap of claim 20, further comprising an adhesive layer located on at
2 least a portion of the patch for attachment to the second end of the strap.

1 26. The strap of claim 25, wherein the adhesive is non-releasable.

1 27. The strap of claim 20, wherein the patch is attached to the strap using an
2 adhesive, stitching or thermal bonding.

1 28. The strap of claim 20, wherein the patch is a continuous portion of the first
2 layer and formed during the process of manufacturing the first layer.

1 29. The strap of claim 20, further comprising at least one reinforcement strap
2 coupled to the strap and positioned generally parallel to a longitudinal axis of the strap.

1 30. A method of securing freight, comprising:

2 a. positioning at least one strap, for restraining freight around at least one piece
3 of freight, wherein the at least one strap for restraining freight comprises:

4 i. a first layer comprising a first end and a second end; and

5 ii. a patch comprising a third end and a fourth end, wherein the third end
6 is pre-attached to the strap at a contact section near the first end prior to
7 installation around the freight;

8 b. securing the at least one strap around the freight to create an intersection
9 between one end of the at least one strap and another end of the at least one strap;

10 c. joining the first end of the at least one strap to the second end of the at least
11 one strap;

12 d. placing the at least one strap under tension; and

13 e. adhering the patch across the intersection.

1 31. The method of claim 30, wherein placing the at least one strap under tension
2 comprises:

3 f. inserting a tool, having a means for holding the at least one strap, onto the
4 first end of the strap;

5 g. clamping an arm of the tool to the second end of the strap; and

6 h. rotating the tool until the strap becomes taut.

1 32. The method of claim 30, wherein the adhesive used to adhere the patch
2 across the intersection of the ends is a non-releasable adhesive.

1 33. The method of claim 30, further comprising affixing the at least one strap to
2 a surface of a transportation device using an adhesive.

1 34. The method of claim 30, wherein the at least one strap further comprises at
2 least one reinforcement strap coupled to the at least one strap and positioned generally
3 parallel to a longitudinal axis of the strap and further comprises coupling a first end of the
4 at least one reinforcement strap to a second end of the at least one reinforcement strap.

1 35. A device for tightening a strap around freight, comprising:

2 a. a body capable of being rotated and comprising:

3 i. a means for holding a first end of a strap; and

- 4 ii. a first head positioned at a first end of the body for receiving a torsion
5 arm; and
6 b. a clamp coupled to the body for holding a second end of the strap and
7 comprising:
8 i. at least two clamp arms, wherein at least one arm is rotatably coupled
9 to the clamp.

1 36. The device of claim 35, wherein the means for holding a strap comprises a
2 slot.

3 37. The device of claim 35, further comprising a cam rotatably coupled to the
4 clamp for securing the at least two clamp arms at a second end.

5 38. The device of claim 37, further comprising a locking arm coupled to the cam
6 for attaching the cam to the clamp arm.

1 39. A method for tightening a strap around a load of freight, comprising:

2 A. positioning at least one strap around at least one piece of freight, the at least
3 one strap comprising a first end and a second end;

4 B. positioning a tensioning tool proximate to the first end and the second end,
5 the tensioning tool comprising:

6 i. a body capable of being rotated and comprising:

7 a. a means for holding a first end of a strap; and

8 b. a first head positioned at a first end of the body for receiving a
9 torsion arm; and
10 ii. a clamp coupled to the body for holding a second end of the strap and
11 comprising:
12 at least two clamp arms, wherein at least one arm is rotatably coupled
13 to the clamp;
14 C. securing the first end within the at least two clamp arms;
15 D. placing the second end within the at least one slot; and
16 E. rotating the body.

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21 40. The device of claim 39, wherein the tensioning tool further comprises a cam
22 rotatably coupled to the clamp and wherein securing the first end of the strap within the at
23 least two clamp arms further comprises rotating and securing the cam.